



## Weather variability and the incidence of cryptosporidiosis: Comparison of time series Poisson regression and SARIMA models

**Author(s):** Hu W, Tong S, Mengersen K, Connell D  
**Year:** 2007  
**Journal:** Annals of Epidemiology. 17 (9): 679-688

### Abstract:

**PURPOSE:** Few studies have examined the relationship between weather variables and cryptosporidiosis in Australia. This paper examines the potential impact of weather variability on the transmission of cryptosporidiosis and explores the possibility of developing an empirical forecast system. **METHODS:** Data on weather variables, notified cryptosporidiosis cases, and population size in Brisbane were supplied by the Australian Bureau of Meteorology, Queensland Department of Health, and Australian Bureau of Statistics for the period of January 1, 1996-December 31, 2004, respectively. Time series Poisson regression and seasonal auto-regression integrated moving average (SARIMA) models were performed to examine the potential impact of weather variability on the transmission of cryptosporidiosis. **RESULTS:** Both the time series Poisson regression and SARIMA models show that seasonal and monthly maximum temperature at a prior moving average of 1 and 3 months were significantly associated with cryptosporidiosis disease. It suggests that there may be 50 more cases a year for an increase of 1 degrees C maximum temperature on average in Brisbane. Model assessments indicated that the SARIMA model had better predictive ability than the Poisson regression model (SARIMA: root mean square error (RMSE): 0.40, Akaike information criterion (AIC): -12.53; Poisson regression: RMSE: 0.54, AIC: -2.84). Furthermore, the analysis of residuals shows that the time series Poisson regression appeared to violate a modeling assumption, in that residual autocorrelation persisted. **CONCLUSIONS:** The results of this study suggest that weather variability (particularly maximum temperature) may have played a significant role in the transmission of cryptosporidiosis. A SARIMA model may be a better predictive model than a Poisson regression model in the assessment of the relationship between weather variability and the incidence of cryptosporidiosis.

**Source:** <http://dx.doi.org/10.1016/j.annepidem.2007.03.020>

### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Temperature

#### Geographic Feature:

resource focuses on specific type of geography

Other Geographical Feature

# Climate Change and Human Health Literature Portal

**Other Geographical Feature :** Subtropical

**Geographic Location:** 

resource focuses on specific location

Non-United States

**Non-United States:** Australasia

**Health Impact:** 

specification of health effect or disease related to climate change exposure

Infectious Disease

**Infectious Disease:** Foodborne/Waterborne Disease

**Foodborne/Waterborne Disease:** Cryptosporidiosis

**Mitigation/Adaptation:** 

mitigation or adaptation strategy is a focus of resource

Adaptation

**Model/Methodology:** 

type of model used or methodology development is a focus of resource

Outcome Change Prediction

**Resource Type:** 

format or standard characteristic of resource

Research Article

**Timescale:** 

time period studied

Time Scale Unspecified

**Vulnerability/Impact Assessment:** 

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content